# USE OF ARTIFICIAL INTELLIGENCE IN EDUCATION

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**Abstract**

*Today, artificial intelligence is one of the emerging technologies which are capable of altering every aspect of our social interactions. In education, AI has begun producing new teaching and learning solutions that are now undergoing testing in different contexts. This paper will let the stakeholders in education sector to understand the extent to which AI will be used in the education and its perceived benefits. This paper provides examples of use of AI in education, particularly in developing countries like India wherein providing education to all is seen as one of the sustainable development goals.*

*First, this paper provides an overview of AI to the reader. It was observed that AI has evolved from simple rule based systems to data-driven systems to context-driven systems that have advanced capabilities. Next, the paper talks an approach to putting AI into use in education to improve learning outcomes. Indeed as a new technology, AI when used in education will bring changes to 'learning experience' by having adjustable learning environment that creates 'personalized learning experience'. Finally, this paper presents some examples of use of AI technology in education sector aimed at improving learning experience and quality of learning.*



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## Introduction

ME AUDREY AZOULAY, DIRECTOR-GENERAL, UNESCO writes "*In the field of education, AI is expected to have a significant impact, transforming the way teachers work by offering new teaching aids. It could revolutionize the way in which students learn through personalised learning and through greater access to knowledge thus also potentially facilitating more inclusive education. Clearly, the possibilities are tremendous.*" (UNESCO MGIEP, 2018) [1]

## Traditional Education System limits Personalized Learning

Recent research in neuroscience has demonstrated that each brain is 'wired uniquely' and thus 'learns differently'. Our traditional education is 'standard' in nature and is focused on curricula geared towards producing a workforce for mass industrial deployment and have implemented the 'one size fits all' approach (Singh and Jain, 2018) [2]. Unfortunately, this has led to the following undesirable results:

- Many individuals trained but unable to adapt to changing job requirements.
- Little consideration for natural talent, thereby killing creativity.
- Little or no love for learning.
- Unhappy, frustrated youth.

Consequently, the current education system finds itself broken, insufficient and ineffective at meeting the demands of the 21st century. The resurgence of Artificial Intelligence or AI, however, offers a ray of hope in achieving such a 'personalised learning system'.

## What in Artificial Intelligence?

Singh and Jain (2018) [2] writes "The term Artificial Intelligence or AI was coined by John McCarthy in 1956, two years after the untimely death of Alan Turing, who came to be known as the father of AI. In 1950, at a time when the first general purpose computers were being built, Turing was already grappling with the question "Can machines think?" He developed a hypothetical machine, called a Turing machine, for encrypting codes built to test and defines Machine Intelligence and thus refers to computer programs that exhibit human-like intelligence such as logical reasoning, problem solving and learning".

It may be noted that AI systems has evolved over the time within the framework described above. A historical review of the evolution of AI systems reveals that they appear to have followed a different process – one that has been driven by algorithm and technology development (Singh and Jain, 2018) [2].

### Framework for Artificial Intelligence

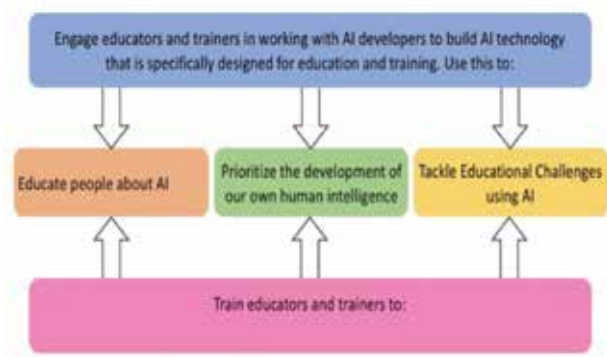
Singh and Jain (2018) [2] suggest following framework for AI that comprises of following aspects. These are:

- Perception – The ability to use sensory systems and language to obtain information about the natural world.
- Problem analysis – The ability to process the information obtained above in order to identify a problem, analyze it and provide a solution.
- Abstract knowledge – The ability to abstract knowledge from perception in one domain and apply it to another.
- Experiential learning – The ability to continually learn from real-world data patterns and refine perception and knowledge.

Artificial Intelligence or AI provides predictions on new scenarios based on learning from large volumes of historical data. It is required to take a holistic look at a range of digital transformation in the education sector. These are augmented reality, virtual reality, videos and blockchain. AI and other digital technologies should be used to help teachers in imparting education (Sarkar, 2018) [3].

## How AI can be put to use in education?

It is advised to have an approach of educating people about use of AI by preparing people to work and live with AI and then use AI in planning educational and training systems (Luckin and Issroff, 2018) [4].


Engage educators and trainers in working with AI developers to build AI technology that is specifically designed for education and training. Use this to:
Educate people about AI
Prioritize the development of our own human intelligence
Tackle Educational Challenges using AI
Train educators and trainers to:

Source: (Luckin and Issroff, 2018) [4]

It may be noted that thoughtful design of AI framework to education and training has the potential to provide significant benefits to educators, learners, parents and the society. It is a reason for great excitement and concerted intelligent effort.

## Changes that AI technology will bring in the education sector

Indeed as a new technology, AI when used in education will bring changes to the entire 'learning' experience'. There are only a few things that forced transitions in the global education industry to change and are as listed below (Blaylock, 2019) [5]:

- Adjustable Learning Environment
- New Opportunities
- Improved Efficiency
- AI-driven Education Platform

Artificial intelligence, with such changes in the education sector that enhances learning may be seen as one of the emerging technologies.



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### Views of Indian Industry Representatives on use of AI in education

Artificial intelligence is the sector with untapped potential. Shobita Dhar provides some of the comments made by representatives of some of the Indian organizations those are working in the area 'Use of AI in Education'. (See the table below).

Table 1: Opinions by representatives of some of the Indian organizations those are working on 'Use of AI in Education' (Dhar, 2019) [6], (Dialani, 2019) [7]

| Name of the Organization Representative | Opinions expressed by the Organization Representative |
|---|---|
| **Sameer Bora, Executive VP, Next Education India Pvt. Ltd.** | Adaptive assessments give very accurate results. Based on these the teacher can give individual feedback to each child on what should be the new learning path. Earlier, students would get a general advice – 'Good. Can do better'. But AI allows teachers to be more focused. |
| **Swapnil Dharmidhikari, Founder, Splashgain Technology Solutions Pvt. Ltd.** | Remote Proctoring is the future monitoring of exams. The technology captures physical movements of the candidate. If the candidate tries to open a new window or an URL it immediately sends an alert to the remote invigilator. In the future physical invigilation will be replaced with digital invigilation. |
| **Prashanth B. R., Co-Founder, Krackin and Kiran G. R., Co-Founder, Krackin** | Algorithms replace mentors in providing customized learning. AI enables students to discover a unique path of learning, customised to their aspiration and capabilities. At present it's being used in 89 colleges, and by 300+ companies. |
| **Sreedhar Narla, CEO-Founder, ICET Solutions, Bengaluru** | Mobile App making attendance register redundant. Traditional attendance takes about 10 minutes, but this app can do the task in one minute. The teacher takes a couple of shots with her phone camera, the images are processed in the cloud and the attendance marked. |
| **Zishaan Hayath, Co-Founder and CEO, Toppr** | At Toppr, we use both AI and AI to layout the learner's characteristics and inadequacies. Singular learning rates and records are pondered. These tests are planned to help a child's trust in zones they surpass desires in and challenge them in areas they don't. This comprehensive technique empowers children to remain energized and spurred. |

Source: (Dhar, 2019) [6], (Dialani, 2019) [7]

Finally, this paper will present some examples of use of AI technology in education sector aimed at improving learning experience and quality of learning.

### Prominent Examples of Use of AI Technology in Education

#### ARTIFICIAL INTELLIGENCE (CODE 417) - CURRICULUM FOR CLASS IX (INSPIRE AND ACQUIRE MODULE) - CBSE

An example of this is provided by Central Board of Secondary Education – CBSE. It is said that CBSE Schools to include AI, Python for Class 8 and 9 Students from 2020 (CBSE, 2019) [8].

Example of a curriculum for Standard 9 Student

UNIT WISE DISTRIBUTION

| UNIT | NAME OF THE UNIT | SUB-UNIT | DURATION | PERIODS |
|---|---|---|---|---|
| 1 | INTRODUCTION TO AI | Excite | 2 Hours 40 Mins. | 4 Periods |
| | | Relate | 02 Hours | 3 Periods |
| | | Purpose | 02 Hours | 3 Periods |
| | | Possibilities | 02 Hours | 3 Periods |
| | | AI Ethics | 3 Hours 20 Mins. | 5 Periods |
| 2 | AI PROJECT CYCLE | Problem Scoping | 14 Hours | 21 Periods |
| | | Data Acquisition | 02 Hours | 3 Periods |
| | | Data Exploration | 04 Hours | 6 Periods |
| | | Modelling | 06 Hours | 9 Periods |
| 3 | NEURAL NETWORK | | 04 Hours | 6 Periods |
| 4 | INTRODUCTION TO PYTHON | | 70 Hours | 105 Periods |
| TOTAL | | | 112 Hours | 168 Periods |

Source: (CBSE, 2019) [8]

### Other Examples of Use of AI Technology in Education

*According to research organization Tracxn, it is observed that in excess of 300 Indian new businesses use AI as their core and invention in their organization. About one tenth of them (11%) are belonging to 'learning and teaching' domain. This is a strong sign of organizations outside of innovation and web based business using AI in their products and services. While a conclusive goal is whole customization, various applications and ventures are helping us in transit. Coaching applications are adjusting their exercise structures depending upon the execution of a stand-out client profile. Expanded information crunching is making trying an undeniably intuitive wonder in India.* (Dialani, 2019) [7]

There will be number of examples about use of AI in education. Some of these are provided herewith. Please note that this list is indicative only and is not exhaustive. (See the table below).



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Table 3: Some of the examples about use of AI in education

| Name of Author | Example and its description |
|---|---|
| **Sarkar (2018) [3]** | AI offering help to teachers in imparting education and can be used for predicting student potential as well as chances of at-risk students dropping out. This information would be valuable for teachers in targeting specific interventions for at-risk students. The state of Andhra Pradesh had conducted a pilot to predict drop-outs based on past student scores and student backgrounds. |
| **Dhar (2019) [11]** | Personalized Learning using adaptive assessment software: Class VIII students of Mount Zion School, Gangtok are writing exams set by a machine. They get questions customized to their pace of learning. Machine-set question papers that use AI: Next Education, an edtech company in Hyderabad, developed an AI driven assessment platform that is used by more than 50 schools in India. This platform can set papers within one minute and customize questions to each student's learning needs. It also gives instantaneous results. Exams at your doorstep: Remote Proctoring is an AI platform that allows teachers to remotely invigilate an online exam. This means that students don't need to physically assemble in an exam hall to write their paper but can do it from anywhere, even from home. This reduces the logistical burden of conducting and writing exams. IIM, Rohtak used Remote Proctoring while conducting its executive MBA entrance exam this year. Mobile App making attendance register redundant: In some government-run schools in Tamil Nadu, the attendance register was replaced by a mobile app. |

## Conclusion

In order for AI based products to be contextualized, commoditized, and available to wider, diverse audience, a rich set of tooling, standards, and best practices are required. The potential of personalised quality education, regardless of geographical, socio-cultural and other affiliations etc.., by means of AI and Deep Learning, is recognised. However, a sustained, coordinated effort to address them holistically, from pedagogical to experiential to business to ethics and governance angles, is required (Dhavala, 2018) [9]. Concerted efforts are needed to develop:

- Data-first platforms
- Shared NLU (Natural language Understanding) and AI infrastructure and
- Agile processes to develop AI products.

These products should eventually be used to create customised, relevant, engaging, explainable and governable solutions for every learner.

It may be concluded that there exists several AI-based products those are used in education sector at present. These examples indicate that there is scope for using AI and other emerging technologies supported with adequate research and innovation.

The author is of the opinion that concentrated efforts are required by all the stakeholders in 'Education' sector so as to understand, accept and use AI based products benefiting them (as applicable). MA

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